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[1]

	☆ U	☆ ρ	μ	☆ D	l	Ω	F_L
M	0	1	1	0	0	0	1
L	1	-3	-1	1	1	0	1
T	-1	0	-1	0	0	-1	-2

$$\pi_1 = D^a U^b \rho^c F_L$$

$$= \{L^a\}\left\{\frac{L^b}{T^b}\right\}\left\{\frac{M^c}{L^{3c}}\right\}\left\{\frac{ML}{T^2}\right\} = \{M^0 L^0 T^0\}$$

$$\begin{cases} M: c+1 = 0 \\ L: a+b-3c+1 = 0 \\ T: -b-2 = 0 \end{cases}$$

$a = -2$, $b = -2$, $c = -1$

$$\pi_2 = D^a U^b \rho^c \mu$$

$$= \{L^a\}\left\{\frac{L^b}{T^b}\right\}\left\{\frac{M^c}{L^{3c}}\right\}\left\{\frac{M}{LT}\right\} = \{M^0 L^0 T^0\}$$

$$\begin{cases} M: c+1 = 0 \\ L: a+b-3c-1 = 0 \\ T: -b-1 = 0 \end{cases}$$

$a = -1$, $b = -1$, $c = -1$

$$\pi_3 = D^a U^b \rho^c l$$

$$= \{L^a\}\left\{\frac{L^b}{T^b}\right\}\left\{\frac{M^c}{L^{3c}}\right\}\{L\} = \{M^0 L^0 T^0\}$$

$$\begin{cases} M: c = 0 \\ L: a+b-3c+1 = 0 \\ T: -b = 0 \end{cases}$$

$a = -1$, $b = 0$, $c = 0$

$$\pi_4 = D^a U^b \rho^c \Omega$$
$$= \{L^a\}\left\{\frac{L^b}{T^b}\right\}\left\{\frac{M^c}{L^{3c}}\right\}\left\{\frac{1}{T}\right\} = \{M^0 L^0 T^0\}$$

$M: \quad c = 0.$

$L: \quad a + b - 3c = 0.$

$T: \quad -b - 1 = 0 \qquad\qquad a = 1 \quad b = -1 \quad , c = 0.$

$$\pi_1 = F(\pi_2, \pi_3, \pi_4).$$

$$\frac{F_L}{\rho U^2 D^2} = F\left(\frac{\mu}{\rho U D}, \frac{l}{D}, \frac{D\Omega}{U}\right).$$

$\boxed{2}$

	Q	B	g	H
~~M~~	~~0~~	~~0~~	~~0~~	~~0~~
L	3	1	1	1
T	-1	0	-2	0

$$\pi_1 = B^a g^b Q$$
$$= \{L^a\}\left\{\frac{L^b}{T^{2b}}\right\}\left\{\frac{L^3}{T}\right\} = \{L^0 T^0\}.$$

$$\begin{cases} L: a + b + 3 = 0. \\ T: -2b - 1 = 0. \end{cases} \qquad a = -\frac{5}{2}, \quad b = -\frac{1}{2}$$

$$\pi_2 = B^a g^b H.$$
$$= \{L^a\}\left\{\frac{L^b}{T^{2b}}\right\}\{L\} = \{L^0 T^0\}.$$

$$\begin{cases} L: a + b + 1 = 0. \\ T: -2b = 0. \end{cases} \qquad a = -1, \quad b = 0$$

$$\pi_1 = F(\pi_2).$$

$$\frac{Q}{B^{\frac{5}{2}} g^{\frac{1}{2}}} = F\left(\frac{H}{B}\right).$$

$$\pi_1 = g^a H^h Q$$

$$= \left\{\frac{L^a}{T^{2a}}\right\}\left\{L^h\right\}\left\{\frac{L^3}{T}\right\} = \left\{L^0 T^0\right\}.$$

$$\begin{cases} L: a + h + 3 = 0. \\ T: -2a - 1 = 0. \end{cases} \qquad a = -\frac{1}{2}, \ h = -\frac{5}{2}$$

$$\pi_2 = g^a H^h B$$

$$= \left\{\frac{L^a}{T^{2a}}\right\}\left\{L^h\right\}\left\{L\right\} = \left\{L^0 T^0\right\}.$$

$$\begin{cases} L: a + h + 1 = 0. \\ T: -2a = 0. \end{cases} \qquad a = 0, \ h = -1.$$

$$\pi_1 = F(\pi_2).$$

$$\frac{Q}{g^{\frac{1}{2}} H^{\frac{5}{2}}} = F\left(\frac{B}{H}\right).$$

$Q \propto B$ より.

$$\frac{Q}{g^{\frac{1}{2}} H^{\frac{5}{2}}} = X \cdot \frac{B}{H}$$

$$Q = X \cdot g^{\frac{1}{2}} B H^{\frac{3}{2}} = XB\sqrt{gH^3} \quad (X\text{は定数})$$

$Q \propto B$ の比例定数.